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10/088,114	07/18/2002	Hiroshi Inoue	NIP-275	8078

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ALEXANDRIA, VA 22314

EXAMINER
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BELENA, JOHN F

ART UNIT	PAPER NUMBER
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3746

DATE MAILED: 08/13/2003

7

Please find below and/or attached an Office communication concerning this application or proceeding.

# Office Action Summary

Application No.

10/088,114

Applicant(s)

INOUE ET AL.

Examiner

John F. Belena, Ph.D.

Art Unit

3746

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

## Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133).
- Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

## Status

- 1) ☒ Responsive to communication(s) filed on 18 July 2002.
- 2a) ☐ This action is **FINAL**. 2b) ☒ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

## Disposition of Claims

- 4) ☒ Claim(s) 1-17 is/are pending in the application.
- 4a) Of the above claim(s) \_\_\_\_\_ is/are withdrawn from consideration.
- 5) ☐ Claim(s) \_\_\_\_\_ is/are allowed.
- 6) ☒ Claim(s) 1-17 is/are rejected.
- 7) ☐ Claim(s) \_\_\_\_\_ is/are objected to.
- 8) ☐ Claim(s) \_\_\_\_\_ are subject to restriction and/or election requirement.

## Application Papers

- 9) ☒ The specification is objected to by the Examiner.
- 10) ☒ The drawing(s) filed on 18 July 2002 is/are: a) ☐ accepted or b) ☒ objected to by the Examiner.
- Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
- 11) ☐ The proposed drawing correction filed on \_\_\_\_\_ is: a) ☐ approved b) ☐ disapproved by the Examiner.
- If approved, corrected drawings are required in reply to this Office action.
- 12) ☐ The oath or declaration is objected to by the Examiner.

## Priority under 35 U.S.C. §§ 119 and 120

- 13) ☒ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☒ All b) ☐ Some \* c) ☐ None of:
1. ☐ Certified copies of the priority documents have been received.
2. ☐ Certified copies of the priority documents have been received in Application No. \_\_\_\_\_.
3. ☒ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).
- \* See the attached detailed Office action for a list of the certified copies not received.
- 14) ☐ Acknowledgment is made of a claim for domestic priority under 35 U.S.C. § 119(e) (to a provisional application).
- a) ☐ The translation of the foreign language provisional application has been received.
- 15) ☐ Acknowledgment is made of a claim for domestic priority under 35 U.S.C. §§ 120 and/or 121.

## Attachment(s)

- 1) ☒ Notice of References Cited (PTO-892)
- 2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
- 3) ☒ Information Disclosure Statement(s) (PTO-1449) Paper No(s) 2.
- 4) ☐ Interview Summary (PTO-413) Paper No(s). \_\_\_\_\_
- 5) ☐ Notice of Informal Patent Application (PTO-152)
- 6) ☐ Other:



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**DETAILED ACTION**

**DRAWINGS**

1. The **drawings** are objected to as failing to comply with 37 CFR 1.84(h)(3) because the section views "A-A" in Figures 2, 4, 5, 7, 8, 11, 13, 16, 17, 19, 20, 22, 23, 25, 26, 27, 29, 32, 33 & 37-38 should be designated by an Arabic or Roman numeral corresponding to the view number of the sectional view. Figure 2 section label is missing the bottom label sign.
2. The **drawings** are objected to because in Figure 4 the reference numeral 81 needs to be moved up and to the right of its leader line because the air flow leader line is also leaving from the reference numeral and it is not clear which leader line corresponds to the reference numeral. A

proposed drawing correction or corrected drawings are required in reply to the Office action to avoid abandonment of the application. The objection to the drawings will not be held in abeyance.

### **SPECIFICATION**

3. The **title** of the invention is not fully descriptive. A new title is required that is clearly indicative of the invention to which the claims are directed.

The following title is suggested: **--GAS TURBINE COMBUSTOR  
WITH FUEL-AIR PRE-MIXER AND PRE-MIXING METHOD FOR LOW  
NO<sub>x</sub> COMBUSTION--**

4. The **disclosure** is objected to because of the following informalities: on page 17, line 12, "14a" should read --14--, line 24, "works" should read --work--, page 20, line 26-27, "nearly a rectangular shape" should read --of a planform trapezoid shape--.

**Appropriate correction is required.**

## CLAIM REJECTIONS - 35 USC § 112

5. The following is a quotation of the second paragraph of 35 U.S.C. 112:

The specification shall conclude with one or more claims particularly pointing out and distinctly claiming the subject matter, which the applicant regards as his invention.

6. **Claims 1-17** are rejected under 35 U.S.C. 112, second paragraph, as being indefinite for failing to particularly point out and distinctly claim the subject matter which applicant regards as the invention.

**Claims 1-11** recite that the diffusive combustion nozzles inject fuel and air. Figure 6 makes clear that the diffusive combustion nozzles (13) only inject fuel into the air stream incoming from (14).

**Claims 1-17** recite that the premixing nozzles are injecting premixed gas. Figures 4 & 6 make clear that the premixing nozzles (8) only inject fuel into the air stream incoming from (30).

## CLAIM OBJECTIONS

7. **Claim 1** is objected to because of the following informalities: content line 12, "air to flow in" is not clear in context as to what structure the air is flowing into. **Appropriate correction is required.**

8. **Claim 2** is objected to because of the following informalities: content line 12, "air to flow in" is not clear in context as to what structure the air is flowing into, line 19, "for the respective" should read --with respect to the-- . **Appropriate correction is required.**

9. **Claim 3** is objected to because of the following informalities: content line 12, "forming respective" should read --forming--, line 13, "for the" should read --with respect to the-- . **Appropriate correction is required.**

10. **Claim 4** is objected to because of the following informality: content lines 3-4, "at the position" should read --in a position-- . **Appropriate correction is required.**

11. **Claim 5** is objected to because of the following informality: content line 3, "the opening" should read --an opening--. **Appropriate correction is required.**

12. **Claim 6** is objected to because of the following informalities: content line 3, "nearly a triangular shape" should read --a planform trapezoid shape--, lines 5 & 7, "to flowing" should read --to air flowing--. **Appropriate correction is required.**

13. **Claim 7** is objected to because of the following informalities: content line 12, "air to flow in" is not clear in context as to what structure the air is flowing into, lines 14 & 15, "for the" should read --with respect to--. **Appropriate correction is required.**

14. **Claim 8** is objected to because of the following informalities: content line 12, "air to flow in" is not clear in context as to what structure the air is flowing into. **Appropriate correction is required.**

15. **Claim 9** is objected to because of the following informalities: content line 12, "air to flow in" is not clear in context as to what structure the air is flowing into, line 13, "for the" should read --with respect to--.

**Appropriate correction is required.**

16. **Claim 10** is objected to because of the following informalities: content line 12, "air to flow in" is not clear in context as to what structure the air is flowing into, lines 16 & 17, "for the respective" should read --with respect to the--. **Appropriate correction is required.**

17. **Claim 11** is objected to because of the following informalities: content line 12, "air to flow in" is not clear in context as to what structure the air is flowing into, line 17, "nearly a triangular shape" should read --a planform trapezoid shape--, lines 19, 20 & 21, "to flowing" should read --to air flowing--, line 22, "the respective two premixing nozzles" should read --any two adjacent premixing nozzles--. **Appropriate correction is required.**



18. **Claims 12, 13 & 14** are objected to because of the following informalities: content line 1, "use" should read --using a-- or --comprising a--, claims 12, 14 line 8 & claim 13 line 9, "for the respective" should read --with respect to the--. **Appropriate correction is required.**

19. **Claims 15 & 16** are objected to because of the following informalities: content line 6, "flown" should read --flowing-- because the air is not flying. **Appropriate correction is required.**

### CLAIM REJECTIONS - 35 USC § 102

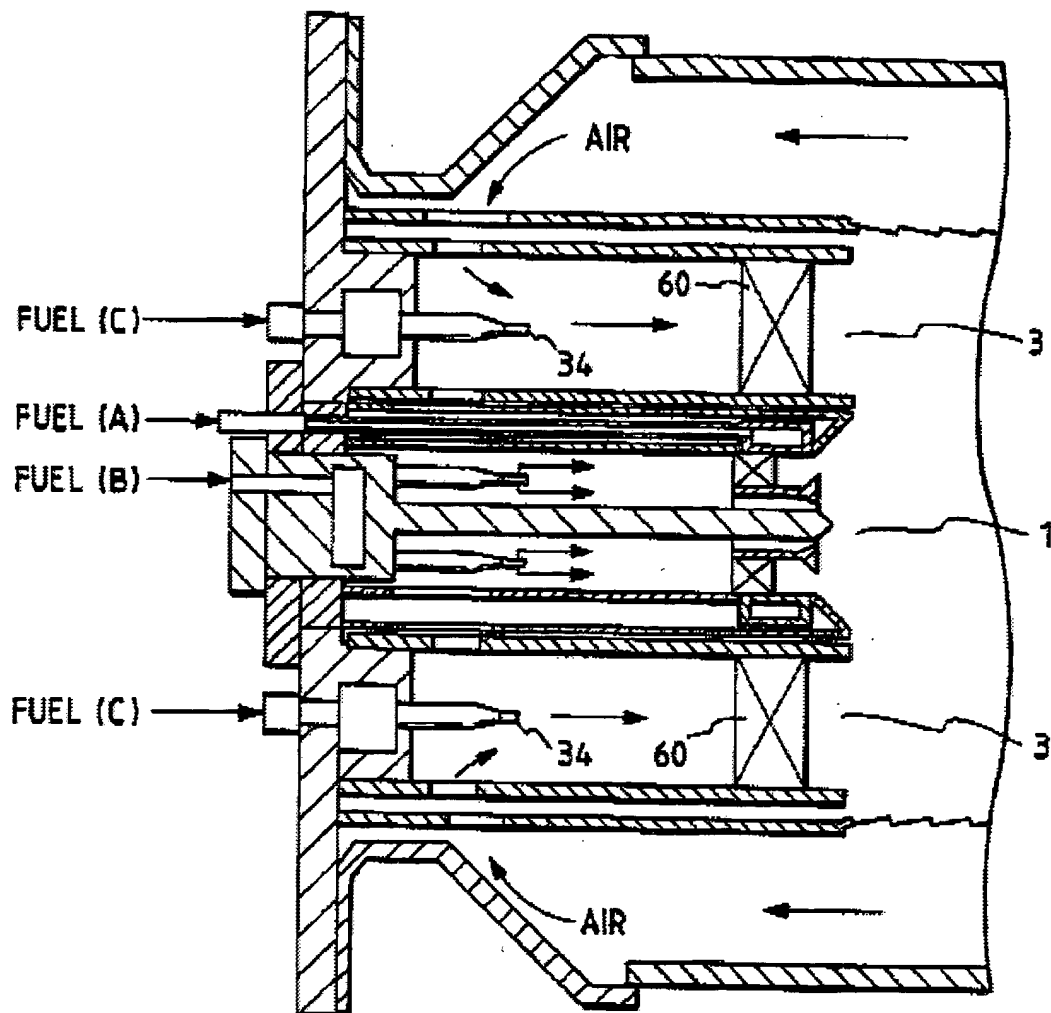
20. The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

A person shall be entitled to a patent unless –

(b) the invention was patented or described in a printed publication in this or a foreign country or in public use or on sale in this country, more than one year prior to the date of application for patent in the United States.

21. **Claims 1 & 7** are rejected under 35 U.S.C. 102(b) as being anticipated by (5,660,045) to Ito et al.

**FIG. 13**



Ito et al., Figure 13 as displayed above discloses according to applicant's **claims 1 & 7**, a gas turbine combustor comprising diffusive combustion nozzles {inner ring of fuel B fed nozzles} which inject fuel and air into a combustion chamber and form a diffusive combustion flame, outer {next to air leader line connected to (60)} and inner {next to reference sign (34)} walls which form an annular premixing flow passage {framed by (60)} and premixing nozzles (34) which are disposed in the premixing flow passage and form a premixing combustion flame by injecting premixed gas formed by premixing fuel and air into the combustion chamber, characterized in that a plurality of the premixing nozzles (34) are arranged in the premixing flow passage {framed by (60)}; opening portions permitting air to flow in are provided at the outer wall {air vents connected to (60)} so that the air flowed into the premixing flow passage forms swirling flow with respect to the premixing nozzles (34); and the opening portions are disposed in circumferential direction and are provided one for every adjacent two premixing nozzles (34). See Ito et al., Figures 1-15, and respective portions, abstract, col. 11 lines 49-65 of the detailed description.

22. **Claims 1, 4 & 7** are rejected under 35 U.S.C. 102(b) as being anticipated by (4,898,001) to Kuroda et al.

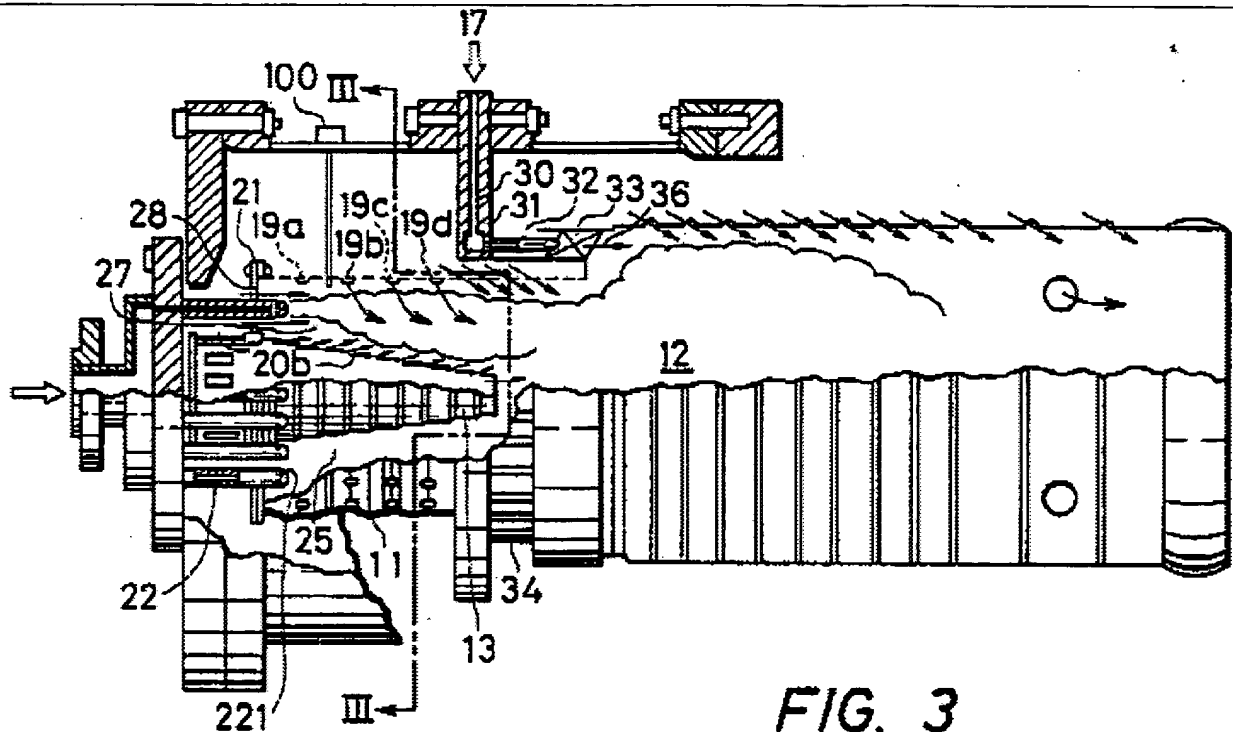
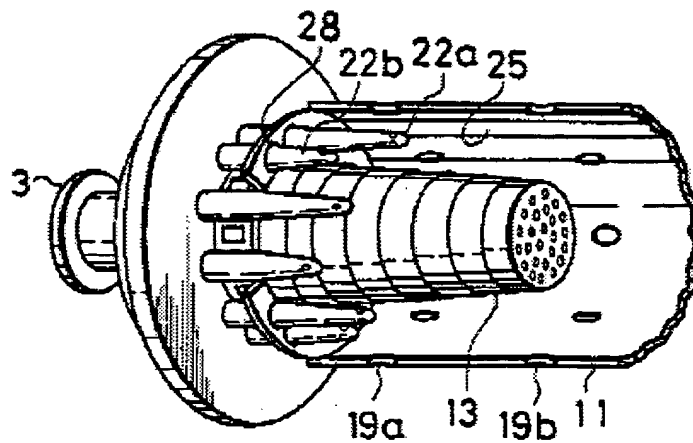


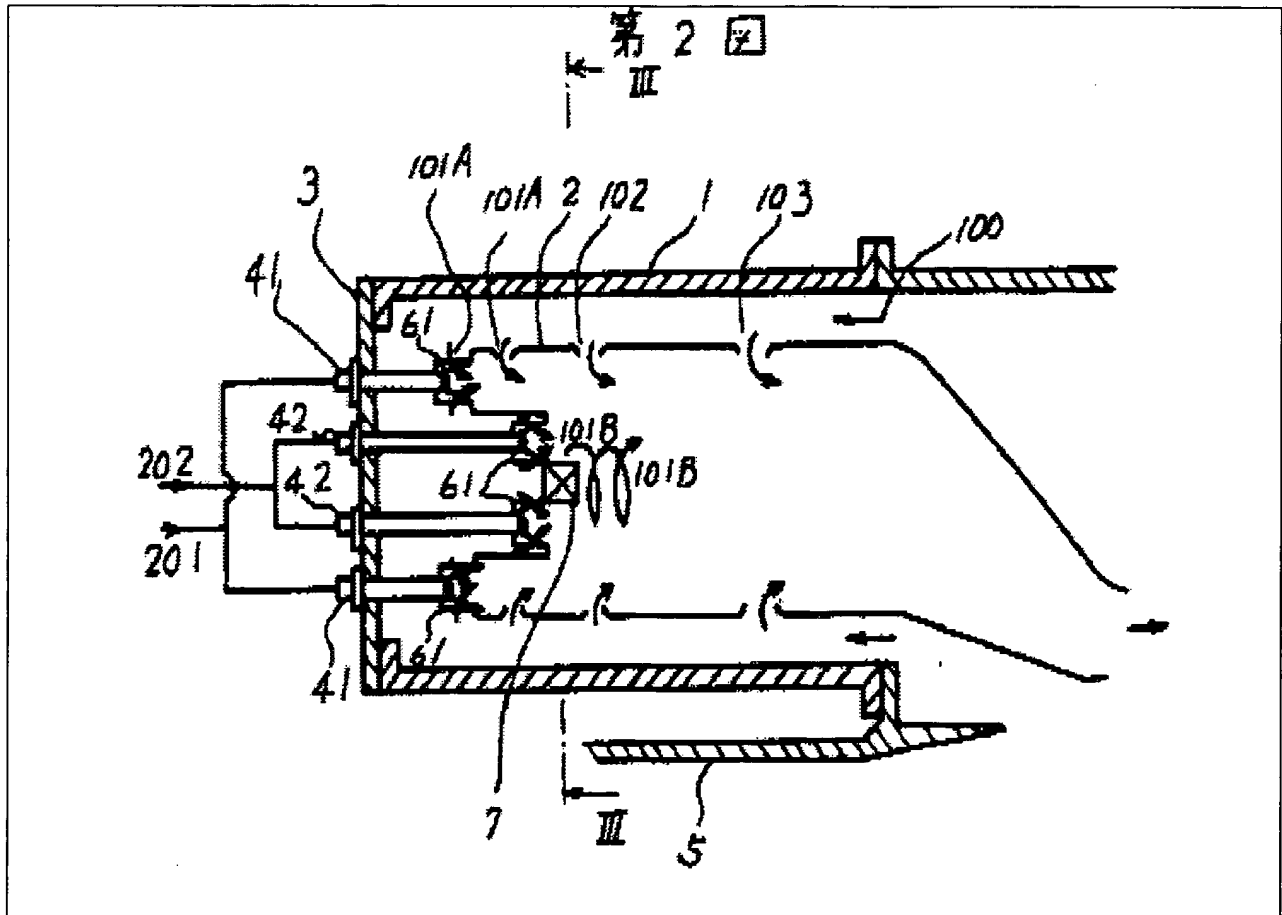
FIG. 4

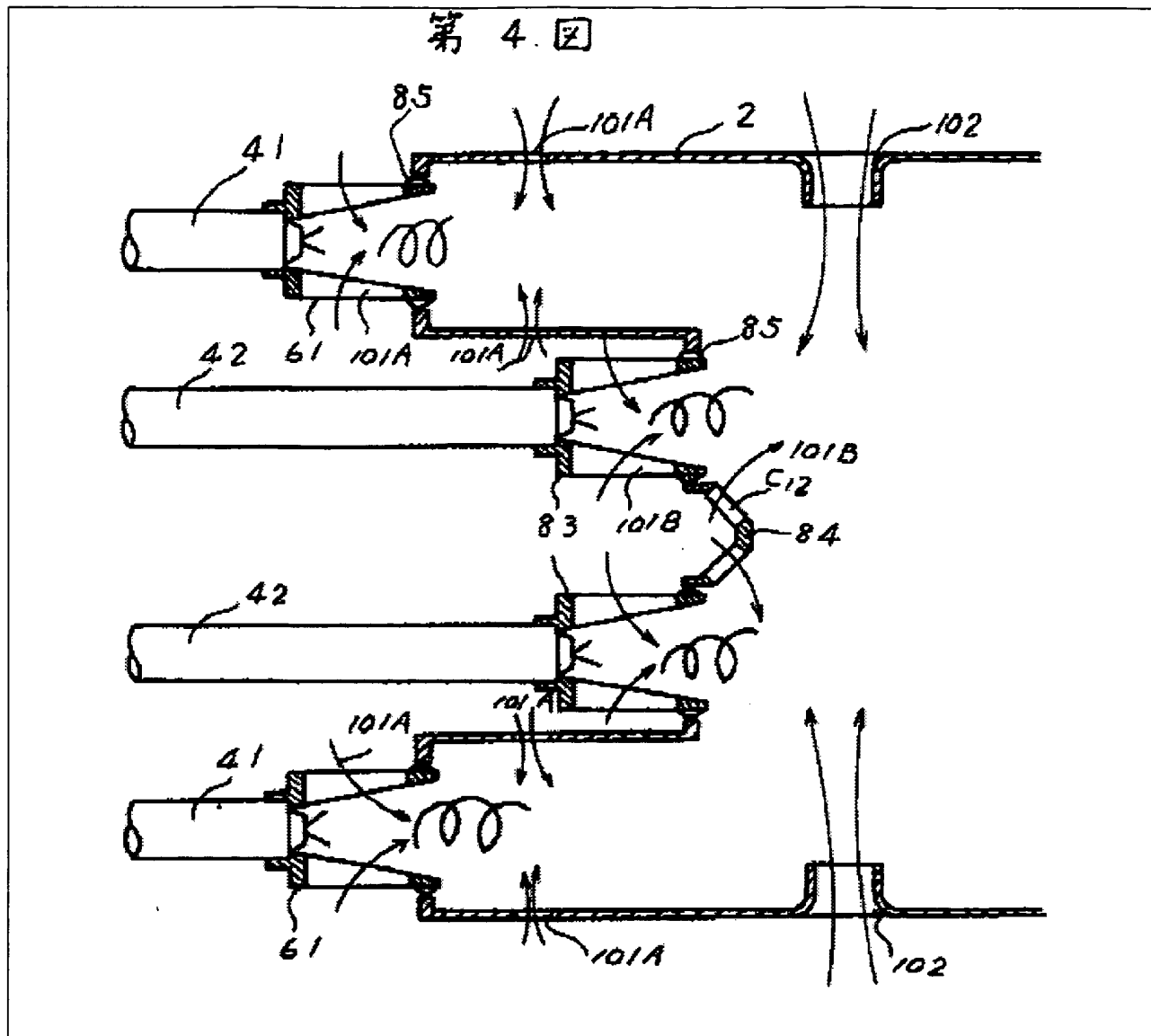


Kuroda et al., Figures 3 & 4 as immediately displayed above discloses according to applicant's **claims 1, 4 & 7**, a gas turbine combustor comprising diffusive combustion nozzles {See Fig. 4, inner ring of fuel fed nozzles} which inject fuel and air into a combustion chamber (12) and form a diffusive combustion flame, outer {(12), (42b)} and inner {(11), (38)} walls which form an annular premixing flow passage {framed by (37), (42a), (42b)} and premixing nozzles (32) which are disposed in the premixing flow passage and form a premixing combustion flame by injecting premixed gas formed by premixing fuel and air into the combustion chamber (12), characterized in that a plurality of the premixing nozzles (32) are arranged in the premixing flow passage {framed by (37), (42a), (42b)}; opening portions {between (43a)-(43b) & between (12)-(43b)} permitting air to flow in are provided at the outer wall {between (43a)-(43b) & between (12)-(43b)} so that the air flowed into the premixing flow passage forms swirling flow with respect to the premixing nozzles (32); and the opening portions {circumferentially framed volume sections between (43a)-(43b) & between (12)-(43b) encompassing every two nozzles (32)} are disposed in circumferential direction and are provided one for every adjacent two

premixing nozzles (32). See Kuroda et al., Figures 2-7, and respective portions, abstract, col. 5 lines 15-68, col. 6 lines 1-40 and col. 11 lines 15-20 of the detailed description.

23. **Claims 1 & 7** are rejected under 35 U.S.C. 102(b) as being anticipated by (JP-355046309-A) to Kusaba et al.



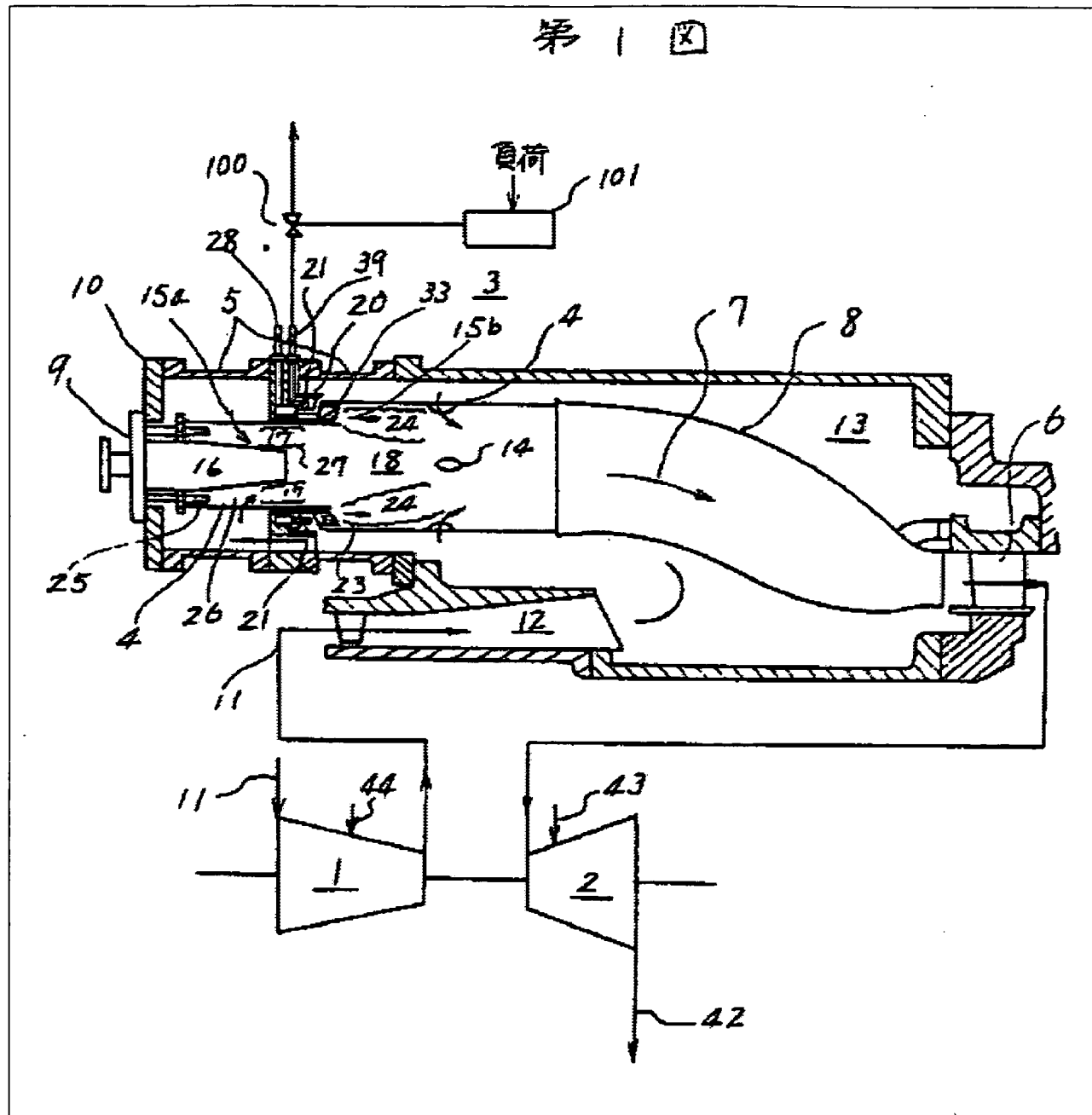


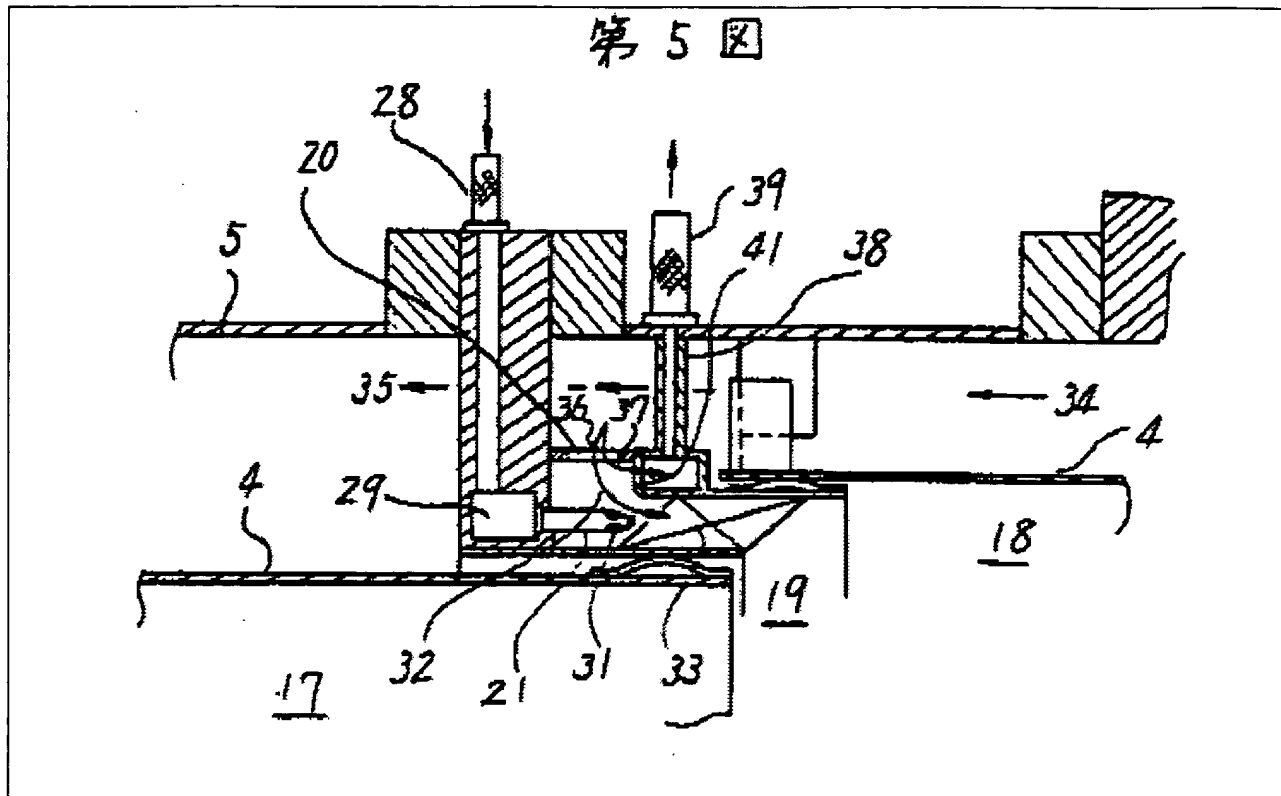
Kuroda et al., Figures 2 & 4 as immediately displayed above discloses according to applicant's **claims 1 & 7**, a gas turbine combustor (1) comprising diffusive combustion nozzles {inner ring of fuel fed nozzles (42)} which inject fuel and air into a combustion chamber (2) and form a

diffusive combustion flame, outer {(2), (61)} and inner {containing (101A) next to (42)} walls which form an annular premixing flow passage {inline with (41)} and premixing nozzles (41) which are disposed in the premixing flow passage and form a premixing combustion flame by injecting premixed gas formed by premixing fuel and air into the combustion chamber (2), characterized in that a plurality of the premixing nozzles (41) are arranged in the premixing flow passage {inline with (41)} opening portions (101A) permitting air to flow in are provided at the outer wall {(2), (61)} so that the air flowed into the premixing flow passage forms swirling flow with respect to the premixing nozzles (41); and the opening portions {(101A) encompassing every two nozzles (41)} are disposed in circumferential direction and are provided {at least} one for every adjacent two premixing nozzles (41). See Kusaba et al., Figures 2 & n4 and English abstract.



24. **Claims 1, 4 & 7** are rejected under 35 U.S.C. 102(b) as being anticipated by (JP-362175524-A) to Iizuka et al.

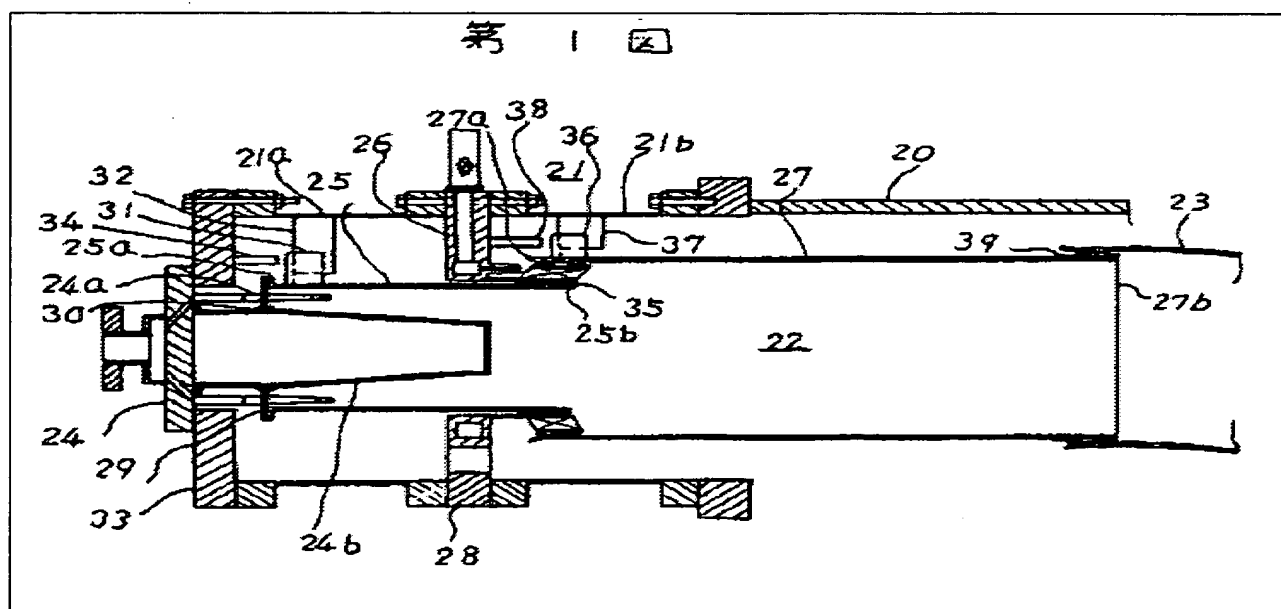


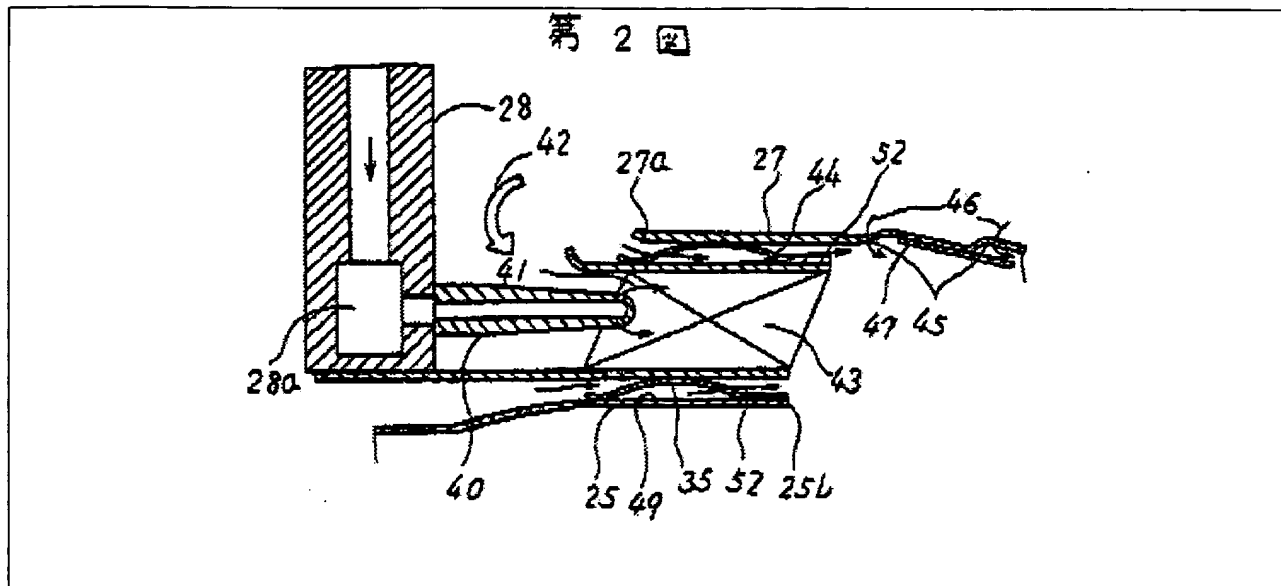


Iizuka et al., Figures 2 & 4 as immediately displayed above discloses according to applicant's **claims 1, 4 & 7**, a gas turbine combustor (4) comprising diffusive combustion nozzles {inner ring of fuel fed nozzles (25)} which inject fuel and air into a combustion chamber (4) and form a diffusive combustion flame, outer and inner walls {framed by (4)} which form an annular premixing flow passage {inline with (21)} and premixing nozzles (21) which are disposed in the premixing flow passage and form a premixing combustion flame by injecting premixed gas formed by

premixing fuel and air into the combustion chamber {(4), (18)},  
characterized in that a plurality of the premixing nozzles (21) are arranged  
in the premixing flow passage {inline with (21)} opening portions (20)  
permitting air to flow in are provided at the outer wall (37) so that the air  
flowed into the premixing flow passage forms swirling flow with respect to  
the premixing nozzles (21); and the opening portions (20) are disposed in  
circumferential direction and are provided {at least} one for every adjacent  
two premixing nozzles (21). See Iizuka et al., and English abstract.

25. **Claims 1-3, 7, 9, 10 & 12-17** are rejected under 35 U.S.C. 102(b) as  
being anticipated by (JP-361119920-A) to Iizuka et al.



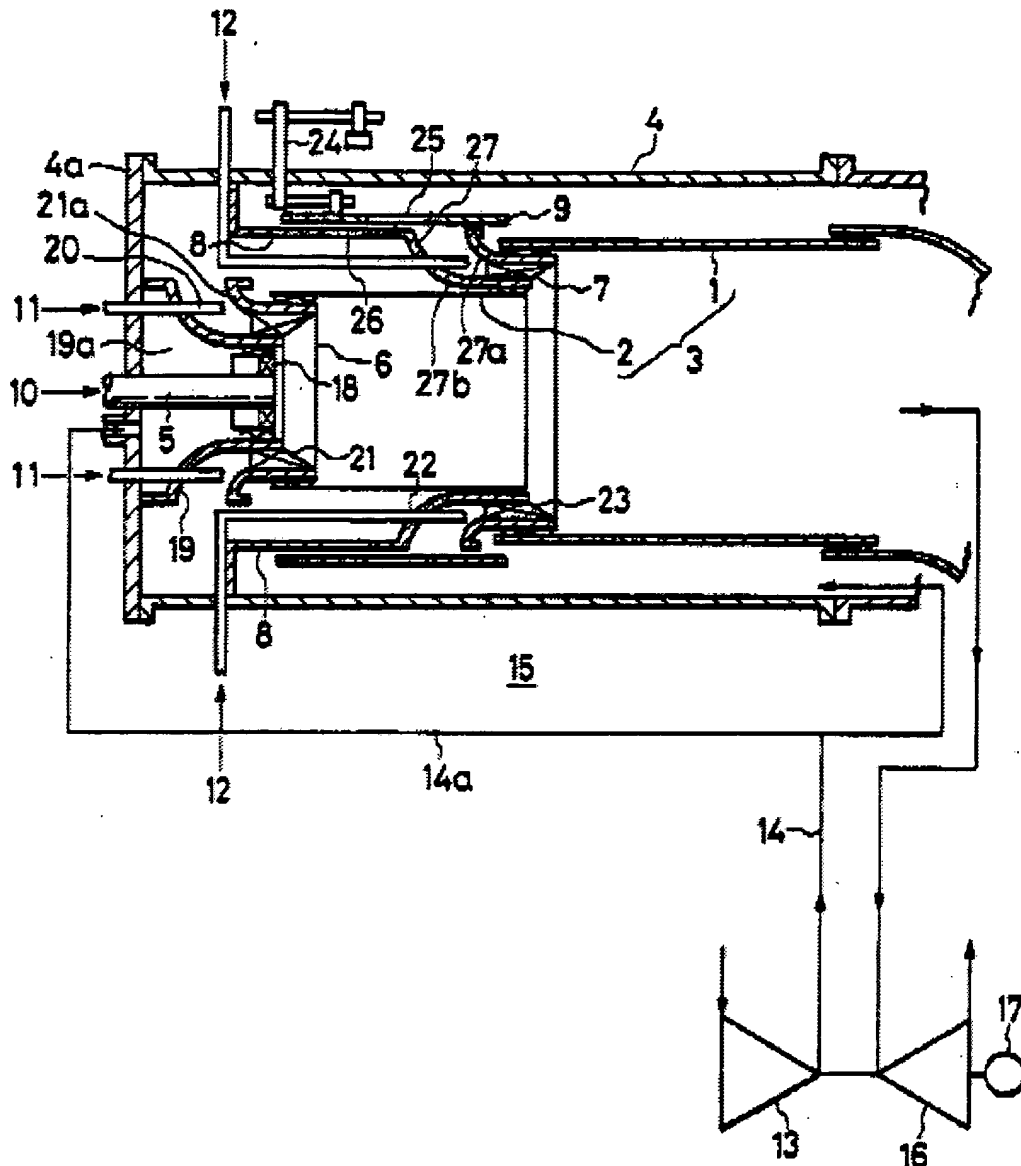


Iizuka et al., Figures 2 & 4 as immediately displayed above discloses according to applicant's **claims 1-3, 7, 9, 10 & 12-17**, a gas turbine combustor (22) comprising diffusive combustion nozzles {inner ring of fuel fed nozzles (24a)} which inject fuel and air into a combustion chamber (22) and form a diffusive combustion flame, outer and inner walls {framed by member (27)-(49) & means for swirling (43)} which form an annular premixing flow passage {inline with (40)} and premixing nozzles (40) which are disposed in the premixing flow passage and form a premixing combustion flame by injecting premixed gas formed by premixing fuel and air into the combustion chamber (22) characterized in that a plurality of the

premixing nozzles (40) are arranged in the premixing flow passage {inline with (40)} opening portions {between (27) & (43), between (49) & (43) and at (41)} permitting air to flow in are provided at the outer wall(s) {(27), (49) and framed by (43)} so that the air flowed into the premixing flow passage forms swirling flow with respect to the premixing nozzles (40); and the opening portions {circumferentially framed volume sections between (27) & (43), between (49) & (43) and at (41) encompassing every two nozzles (40)} are disposed in circumferential direction and are provided {at least} one for every adjacent two premixing nozzles (40) wherein the swirling flows at (41) can rotate in directions opposite each other in the circumferential direction {especially during turbine gas flow transients like as during faulty starts or shutdowns} for every adjacent two premixing nozzles (40). See Iizuka et al., Figures 1 & 2, and English abstract.

26. **Claims 1-3, 7, 9, 10 & 12-17** are rejected under 35 U.S.C. 102(b) as being anticipated by (5,069,029) to Kuroda et al.

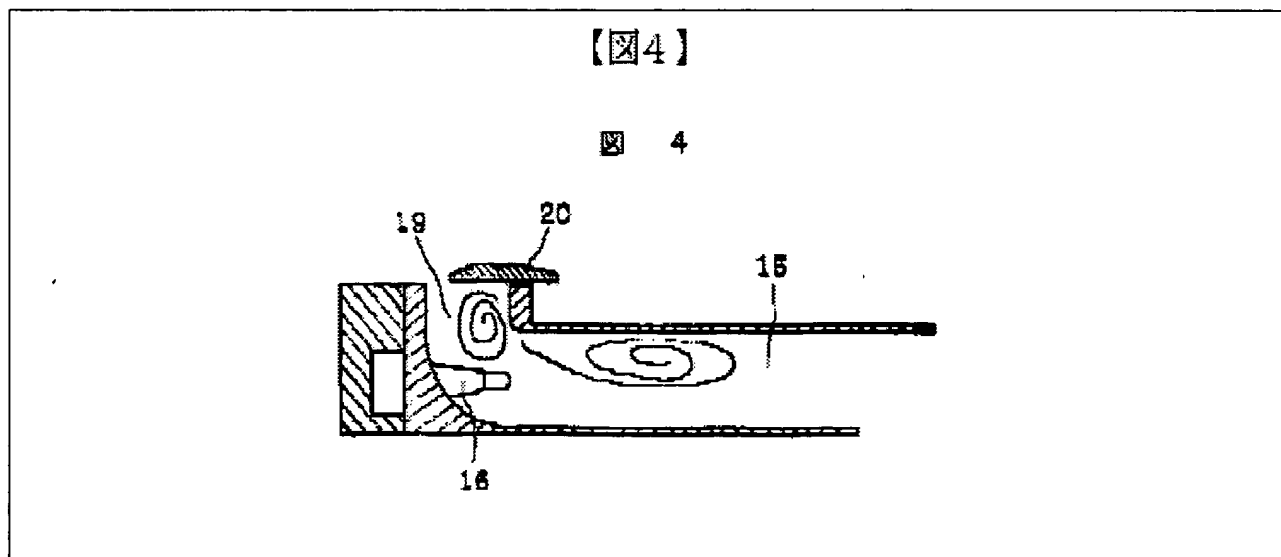
**FIG. 1**



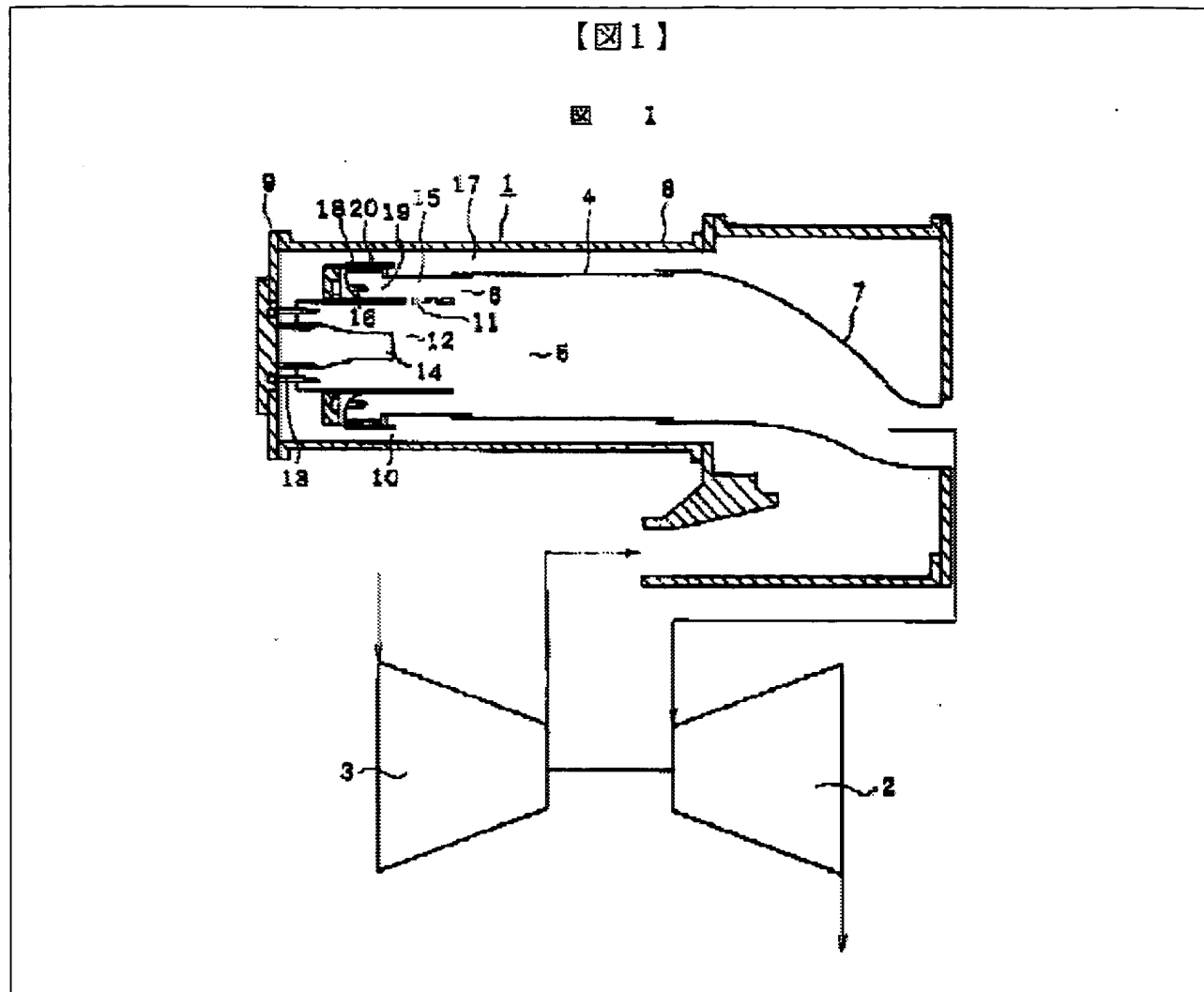
Kuroda et al., Figure 1 as immediately displayed above discloses according to applicant's **claims 1-3, 7, 9, 10 & 12-17**, a gas turbine combustor (1) comprising diffusive combustion nozzles {inner ring of fuel fed nozzles (20)} which inject fuel and air into a combustion chamber (1) and form a diffusive combustion flame, outer and inner walls {framed by member (1), (2)-(9) & means for swirling (7)} which form an annular premixing flow passage {inline with (22)} and premixing nozzles (22) which are disposed in the premixing flow passage and form a premixing combustion flame by injecting premixed gas formed by premixing fuel and air into the combustion chamber (1) characterized in that a plurality of the premixing nozzles (22) are arranged in the premixing flow passage {inline with (22)} opening portions {between (2) & (27b), between (1) & (27b), between (8) & (9) and at (25)} permitting air to flow in are provided at the outer wall(s) {(9) and framed by (43)} so that the air flowed into the premixing flow passage forms swirling flow with respect to the premixing nozzles (22); and the opening portions {circumferentially framed volume sections between (27b) & (2), between (1) & (27b) and between (8) & (9) encompassing every two nozzles (22)} are disposed in circumferential

direction and are provided {at least} one for every adjacent two premixing nozzles (22) wherein the swirling flows at {(22) in (27b)} can rotate in directions opposite each other in the circumferential direction {especially during turbine gas flow transients like as during faulty starts or shutdowns} for every adjacent two premixing nozzles (22). See Kuroda et al., Figures 1 & 4 and respective portions, abstract, col. 3 lines 18-68, col. 4 lines 1-68 and col. 5 lines 1-9 of the detailed description.

27. **Claims 1, 4 & 7** are rejected under 35 U.S.C. 102(b) as being anticipated by (JP-08135969) to Shohei et al.







Shohei et al., Figures 1 & 4 as immediately displayed above discloses according to applicant's **claims 1, 4 & 7**, a gas turbine combustor comprising diffusive combustion nozzles {See Fig. 1, inner ring of fuel fed nozzles (13)} which inject fuel and air into a combustion chamber (5) and form a diffusive combustion flame, outer {compound}{(15)-(20)} and inner

{part of (15)} walls which form an annular premixing flow passage (15) and premixing nozzles (16) which are disposed in the premixing flow passage and form a premixing combustion flame by injecting premixed gas formed by premixing fuel and air into the combustion chamber (5), characterized in that a plurality of the premixing nozzles (16) are arranged in the premixing flow passage (15); opening portions (19) permitting air to flow in are provided at the outer {compound} wall {(15)-(20)} so that the air flowed into the premixing flow passage forms swirling flow with respect to the premixing nozzles (16); and the opening portions (20){circumferentially framed volume sections encompassing opening (20) and every two nozzles (32)} are disposed in circumferential direction and are provided one for every adjacent two premixing nozzles (16). See Shohei et al. Figures 1 & 4 and English abstract.

**\*\*The claims were examined with the broadest reasonable interpretation of the claimed structural/functional subject matter. A proper and acceptable response to this office action requires addressing all issues/objections/rejections invoked in this office action.\*\***

## ALLOWABLE SUBJECT MATTER

28. **Claim 5, 6, 8 & 11** would be allowable if rewritten to overcome the rejection(s) under 35 U.S.C. 112, second paragraph, and claim objections as set forth in this Office action and to include all of the limitations of the base claim and any intervening claims.

## CONCLUSION

29. The prior art made of record and not relied upon is considered pertinent to applicant's disclosure. The following selected patents and technical literature is cited to further show the state of the art in gas turbine combustors with pre-mixers and related technology in general where the not all obvious salient features of the patents are disclosed as follows:

↓ US Patent No. 6,092,362 to Nagafuchi et al. discloses a gas turbine combustor with a plurality of premix burners (2-a, 2-b) and a diffusion burner (8).

✚ US Patent No. 5,349,812 to Taniguchi et al. discloses a gas turbine combustor for low NO<sub>x</sub> production with a plurality of diffusion burners and premix burners.

✚ US Patent No. 5,323,614 to Tsukahara et al. discloses a premixed combustor for a gas turbine containing a plurality of diffusion and premix burners.

✚ US Patent No. 5,121,597 to Urushidani et al. discloses a gas turbine combustor with premix and diffusion nozzles and method for operating the same.

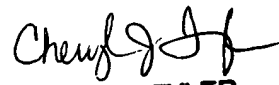
✚ US Patent No. 4,677,822 to Iizuka et al. discloses a gas turbine combustor with premixing section.

✚ Us Patent No. 4,829,764 to Iizuka et al. discloses a gas turbine combustor with premix fuel nozzles and diffusion fuel nozzles.

**\*\*Please review the above six patents when amending the current claims for they contain structural/functional material that read on the present claims.\*\***

30. Any inquiry concerning this communication from the examiner should be directed to **John F. Belena, Ph.D. whose telephone number is (703) 305-3533**. The examiner can normally be reached on Monday through Thursday from 9:00 AM to 5:00 PM. The examiner can also be reached on alternate Fridays from 9:00 AM to 5:00 PM. If attempts to reach the examiner by telephone are unsuccessful, the **examiner's supervisor, Timothy S. Thorpe, can be reached on (703) 308-0102**. The fax number for this Group Art Unit 3746 is (703) 872-9302. Any inquiry of a general nature or relating to the status of this application or proceeding should be directed to the Group Art Unit 3746 receptionist whose telephone number is (703) 308-0861.

  
\_\_\_\_\_  
*John F. Belena, Ph.D.*  
*Group Art Unit 3746*

  
CHERYL J. TYLER  
PRIMARY EXAMINER

8/7/03

